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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,398	02/25/2002	Neng-Hui Yang	13078.22US01	6880

23552 7590 09/05/2003

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EXAMINER

BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/084,398	Applicant(s) YANG ET AL.	
	Examiner Richard Bueker	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: _____ |

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Applicants should correct the following occurrences of non-grammatical or non-idiomatic English. In claims 1, 8 and 14, line 1 of each, "a" should be inserted before "vapor". In claim 1, line 6, "remain" should be "remains". In claim 1, line 11, "a" should be "an", and "disposes" should be "is disposed". In claim 1, line 13, "that purged" should be "that is purged". In claim 5, line 3, "connect" should be "connects". In claim 5, line 4, "depositing" should be "located" or "positioned". In claim 8, line 2, "a" should be inserted before "chemical". In claim 8, line 8, "remain" should be "remains". In claim 8, line 13, "a" should be "an". In claim 8, line 15, "that purged" should be "that is purged". In claim 8, line 16, "mean" should be "means". In claim 8, line 17, "depositing" should be "located" or "positioned". In claim 10, line 4, and also in claim 14, lines 28-29, "the device consisting of heating coil and infrared ray" should be changed to "the group consisting of "heating coils and infrared ray heaters". In claim 13, line 3, "connect" should be "connects". In claim 13, line 4, "deposited" should be "is positioned" or "is located". In claim 14, line 2, "a" should be inserted before "chemical". In claim 14, line 5, "atomization" should be "atomized". In claim 14, line 6, "injecting" should be "is injected". In claim 14, line 8, "remain" should be "remains". In claim 14, line 14, the period should be changed to a comma. In claim 14, line 15, "a" should be "an", and "disposes" should be "is disposed". In claim 14, line 17, "that been" should be "that has been". In claim 14, line 19, "connect" should be "connecting". In claim 14, line 21, "the passage that deposited" should be deleted and replaced with "located" or "positioned". In claim 14, line 25, "depositing" should be "positioned" or "located".

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Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the preamble of each of claims 1, 8 and 14, the phrase "vapor liquid delivery system" is unclear. It is noted that the apparatus disclosed in applicants' specification is a vapor delivery system. In claims 8-13, the phrase "heating liquid injection apparatus" lacks proper antecedent basis because line 1 of claim 8 only recites a "heating injection apparatus". Also, in each of claims 1, 8 and 14, the phrase "liquid source" is used in an inconsistent manner. In claim 1, lines 3 and 4, for example, the phrase "said liquid injector is used to inject a liquid source and make said liquid source atomized", uses "liquid source" to refer to liquid that is in the process of being atomized. In claim 1, lines 8 and 9, however, the phrase "said three-way valve is used to connect said liquid source, said purging gas provider and said liquid injector" uses "said liquid source" to mean a supply of liquid such as that labeled 200 in Fig. 2. It is suggested that the phrase "liquid source" be changed to "source liquid" in claim 1, lines 3-4, 6 and 13; in claim 3, line 3; in claim 6, line 3; in claim 8, lines 3-4, 8, 15 and 19; and in claim 14, lines 4-5, 8, 11 and 17. Also, the phrase "said liquid source" should be changed to "a liquid source" in claim 1, line 9; claim 8, line 11; and in claim 14, line 13. Also, in claim 8, line 17, and claim 14, line 25, the use of the word "depositing" is non-idiomatic, vague and indefinite.

Claims 4, 7, 10-12 and 14-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one

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skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification discloses the material TMCTS as being used as the liquid source material to be atomized, but the specification does not disclose a step of using TMCTS as the carrier gas in the manner recited in claims 4, 7, 12 and 16. Also, in claims 10-11 and 14-16, the recited infrared ray thermostat device is not properly enabled by the specification as filed.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sun (6,409,839). Sun (Fig. 6) discloses a vaporizer having a liquid injector that is inherently a "liquid injection module". A first three-way valve connects the liquid injector to a purge gas provider 72 and a liquid source 14. the discharge line 68 is an exhausting branch. The particular inert

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gases listed in claim 2 are a recitation of intended use that do not so limit the present apparatus claims.

Claims 1-4, 8-9 and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sturm (6,178,925). Sturm (Fig. 1) discloses a flash vaporizer having a liquid injector 22 that supplies source liquid to a hot surface, which inherently causes atomization to at least some degree in the process of flash vaporization. Sturm's flash vaporizer is inherently a "liquid injection module". A purge gas provider 40 and a liquid source 32 are connected to the liquid injector by a first three-way valve 24. The discharge outlet 60 is an exhausting branch as recited in claims 1 and 8. The particular inert gases listed in claims 2 and 9 are a recitation of intended use that do not so limit the present apparatus claims.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (JP 2001-250819) taken in view of Lei (US 2003/0049933) and in further view of Sun (6,409,839) and/or Sturm (6,178,925). Noguchi discloses a liquid injection module (see Fig. 9) for vaporizing a source liquid and delivering the vapor to a CVD reactor. Fig. 9 of Noguchi illustrates that the vaporizer includes a liquid injector 41. Noguchi doesn't specifically say that the liquid is atomized, but Lei (see Figs. 6-8) describes the same type of vaporizer, and Lei (paragraphs 41 and 42) teaches that the liquid is atomized in this type of vaporizer, and it is well known in the art, as illustrated by Lei, that atomization inherently occurs in a vaporizer of the type used by Noguchi. Noguchi teaches (see Fig. 4, for example) the use of a purge gas line connected to the source liquid inlet line 46 for purging source liquid from the portion of line 46 that is near

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the heated vaporizer, but Noguchi doesn't teach the use of a three-way valve to connect the purge gas line to the source liquid inlet line 46. Sun (see Fig. 6) and Sturm (see Fig. 1) both also teach the use of a purge gas line for purging source liquid from the source liquid inlet line of a vaporizer. Furthermore, Sun (see valve 70 of Fig. 6) and Sturm (see valve 24 of Fig. 1) both also teach that the purge gas line can be successfully connected to the source liquid inlet line by means of a well-known three-way valve. It is well known in the art that a three-way valve such as valve 70 of Sun or valve 24 of Sturm can be used as a more compact replacement for two valves such as valves 33 and 34 of Fig. 4 of Noguchi. It would have been obvious to one skilled in the art to use a three-way valve to connect the purge gas line to the source liquid inlet line of Noguchi, in view of the teachings of Sun and Sturm that a three-way valve can successfully be used for that purpose. Regarding the "exhausting branch" recited in claim 1, it is noted that Noguchi (see Figs. 1, 6 and 8) also teaches that the vapor delivery line (16 and 17) for delivering vapor to the CVD reaction chamber 1 is connected to a branch line for purged liquid expelled from the vaporizer by purge gas. Also, the particular inert gases listed in claim 2 are a recitation of intended use that do not so limit the present apparatus claims.

Claims 5-9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi taken in view of Lei, and Sun and/or Sturm, for the reasons stated in the previous paragraph rejection, and taken in further view of Yamamuka (6,110,283). Noguchi (Figs. 1, 6 and 8) provides valves 7 and 8 to switch his vapor flow into the exhausting branch 18, but he doesn't discuss the use of a three-way valve for this

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purpose. Lei (see Fig. 5, three-way valve 192) and Yamamuka (see Fig. 1, three-way valve at junction of vapor delivery line 17 and vent line 17) each teach the use of a three-way valve on a gas line down-stream of a vaporizer for connecting the gas line with an exhausting branch (i.e. vent line) and a delivery line that is connected to a CVD reaction chamber. Lei (paragraph 43) teaches that the three-way valve 192 allows source vapor to flow to by-pass the CVD chamber during the process of stabilizing the flow prior to introduction to the CVD chamber. Noguchi (paragraph 10 of translation) teaches that his exhausting branch 18 is used for this same purpose of stabilizing initial flow. Yamamuka (col. 7, lines 31-33) teaches that his three-way valve can be used for purging unnecessary CVD source material through the exhausting branch 52. Noguchi (paragraph 53 of the translation) teaches that his exhausting branch and waste tank 10 are used for the same purpose. It would have been obvious to use a three-way valve of the type taught by Lei and Yamamuka to connect Noguchi's exhausting branch 18 because Lei and Yamamuka teach that such a three-way valve can successfully be used for switching a vapor flow back and forth between an exhausting branch and a CVD chamber delivery line, wherein the exhausting branch is used for the same purposes as in Noguchi. Regarding the limitation of a heating means "deposited" between the liquid injector and carrier gas provider as recited in claims 8-16, it is noted that the heater 44 of Noguchi's Fig. 9 vaporizer, and also the heater of Fig. 8 of Lei (see also paragraphs 52 and 53 of Lei) are positioned between the liquid injector and a carrier gas provider.

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Claims 10-11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi taken in view of Lei, Sun and/or Sturm (6,178,925), and taken in further view of Yamamuka for the reasons stated in the previous paragraph rejection, and taken in further view of Ewing (5,553,188). Regarding the recited heating coil of claims 10-11 and 14-16, Ewing (Fig. 4, col. 4, lines 41-44 and col. 7, lines 7-10) teaches the use of a heater in the form of a coil to heat a vaporizer. It would have been prima facie obvious to provide the heater 44 of Noguchi's Fig. 9 vaporizer in the form of a coil because Ewing makes clear that a heater in the shape of a coil can successfully be used to heat a vaporizer.

Claims 8, 9, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi taken in view of Lei, Sun and/or Sturm (6,178,925), and taken in further view of Yamamuka for the reasons stated in the previous paragraph rejection, and taken in further view of Nagashima (5,419,924), Chen (6,267,820) and Kanishak (6,086,711). If for argument's sake the heaters of Noguchi and Lei did not read on the heater recited in claims 8-16, such would be obvious in view of Nagashima. Nagashima (see Fig 1, gas heater 18, and also col. 3, lines 26-28) teaches that it is desirable to preheat the carrier gas prior to introducing it into a vaporizer. It is noted that Nagashima's vaporizer (see Fig. 4) is the same type of vaporizer as used by Noguchi (see Fig. 9) and Lei (see Figs. 6-8). Sturm (see Fig. 1, element 56) also teaches the use of a carrier gas preheater. It would have been obvious to use a carrier gas preheater of the type taught by Nagashima or Sturm with the vaporizer of Noguchi because Nagashima and Sturm teach that preheated carrier gas can successfully be

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use to vaporize a source gas. Chen also discloses a vaporizer of the type used by Noguchi, Lei and Nagashima. Chen is cited for his teaching (col. 1, lines 39-44) that this type of liquid injector is susceptible to clogging by reaction with moisture and other contaminants, and thus Chen provides an additional reason why it would be obvious to provide a purge gas to remove liquid from such a liquid injector. Regarding the recited heater coil of claims 10-11 and 14-16, Kanishak (see Fig. 1, element 18, and col. 3, lines 24-27) teaches the use of a heating coil to preheat carrier gas that is used in a vaporizer. It would have been obvious to one skilled in the art to use a heating coil as the carrier gas heater of Nagashima because Kanishak teaches that a heating coil can successfully be use to heat carrier gas.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gauthier (6,132,515), Fukunaga (6,036,783) and Jolly (3,930,908) are cited of interest for their disclosures regarding three-way valves.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (703) 308-1895. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

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Richard Bueker

Richard Bueker
Primary Examiner
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